Bioenergy Policies in Africa

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ABSTRACT

Many developing countries are now working to update their existing energy strategies and to formulate new policies that can accommodate rises in domestic and external supply and demand for biofuels. This paper presents a case for mainstreaming gender into developing countries' biofuels policies, and uses a review of the literature on gender and bio*energy* to suggest some important avenues for future research to expand the current poor state of information on gender and the newer issue of bio*fuels*. The paper opens with a brief discussion on the motivation for interest in biofuels in developing countries and suggests that, in the integrated global context of biofuels, the conditions that generate inequality between rich and poor remain unchanged. It then discusses equity and energy poverty, and points to the lack of empirical evidence on gender issues relating specifically to biofuels. From this it turns to our knowledge of what the existing state of broader bioenergy use can tell us about bringing gender equity to developing countries' energy policies, and suggests that gender equity can be 'energized' through a perspective that focuses as much on social roles and relations between men and women as it does on ascribed responsibilities. National level bioenergy Policy Working Groups (PWGs) are then introduced as having an important role to play in ensuring that gender issues are mainstreamed into policy.

INTRODUCTION

Policymakers and research institutions in most developed and developing countries have only in the last few years seriously turned their attention to biofuels. A small number of countries, including Brazil, have for some time supported successful large-scale programmes to improve the production and consumption of biofuels,[1] but there is less of a track record in developing countries. In sub-Saharan Africa in particular, few countries have to date included biofuels strategies in their (bio)energy or national development policies.[2] The developing country bioenergy policy focus so far has concentrated on bioresources, which are traditionally used for heating and cooking and account for up to 90 per cent of total energy used in some developing countries and 15 per cent of total energy consumed globally.[3] While biofuel production has taken place for some decades in Africa, for example in Malawi where small-scale bioethanol production has occurred since the early 1980s (Wambua CM, unpublished) and in Mali where jatropha has been widely used,[4] the policy situation is now changing to meet an upscaling in biofuel production. Many developing countries are now working to update their existing energy strategies and to formulate new policies that can accommodate rises in domestic and external supply and demand for biofuels.

1. DRIVERS FOR CHANGE

Where biofuels are discussed in relation to developing countries it is often in terms of 'first generation' energy crops that are produced from starch- or sugar-rich plants such as sugar cane or maize (for bioethanol), or oilseeds such as rapeseed, soy, palm or jatropha (for biodiesel), and the fact that many of these crops are edible. The so-called food-versus-fuel debate that surrounds these crops[5] has, in part, prompted research into

'second generation' or 'advanced' non-edible biofuels that are regarded by some as one of the most obvious ways to avoid future food-fuel resource issues, especially in developing countries.[6]

A significant motivation for interest in biofuels has been rising fossil fuel prices over the past few years and a concomitant desire to reduce a dependency on oil imports from OPEC countries. Among many fossil fuel-importing developed countries a part-solution to this problem has been a mandatory blending of fossil fuels with biofuels, thereby increasing demand. In 2006 at least 36 states/provinces and 17 countries had already set mandates for blending biofuels into vehicle fuels, most of these requiring blending 10–15 per cent ethanol with gasoline or blending 2–5 per cent biodiesel with diesel fuel.[7] The following year, 2007, forty out of fifty countries surveyed for the *Global Biofuels Outlook* then had legislation to promote biofuels.[8] Recent targets now define even higher levels of envisaged biofuels use in many countries,[7] including developing countries, such that over the next 15 to 20 years biofuels may be providing a full 25 per cent of the world's energy needs.[9]

With growing concerns over 'food-versus-fuel', and with consumers' worries about deforestation and climate change,[10,11] a number of European countries are now scaling back demand for biofuels originating from developing countries.[12] This has not deterred Brazil and the USA – the world's leading bioethanol producers – who, alongside foreign private investors from other countries,[13] continue to promote biofuel development, especially in developing countries.[12] Here the trend in biofuels production has so far been

towards large-scale operations with concentrated ownership, driven by economies of scale, long-term security of assets, and greater assurance of quality and regularity of supply to meet the standards of European and United States markets.[14] The arguments against to these large-scale operations though come in rural development policies and issues of land tenure. In Tanzania, for example, there are specific concerns around whether the land laws can provide adequate protection against land alienation for biofuel production, and whether compensation payments provided for in the Village Land Act (1999) are sufficient to promote alternative livelihood opportunities.[13]

Despite these concerns, there is no doubting though that biofuels *do* offer significant opportunities to developing countries, not least in fossil fuel import reduction or substitution. To take the example of Tanzania again, biofuel production has the potential to provide a substitute for costly oil imports, currently at US$ 1.3-1.6 billion per year, or 25 per cent of total foreign exchange.[13] Additionally, biofuels bring to developing countries the prospect of new markets for agricultural outputs[1] and the chance to link the internationally-agreed Millennium Development Goals (MDG) targets with livelihoods and rural development objectives concerning economic investment and growth, job creation and improvements in human capital, and upgrading of local infrastructure. The reality of rural development policies, however, is that while they usually do exist, they vary in strength between countries and are implemented to different degrees depending on local (often political) circumstances. It should also not be assumed that rural development policies which are designed to protect the rights and livelihoods of local people will necessarily converge with all of the opportunities that new biofuel investment

are said to bring. In the main, rural development policies are not specific to the new particular situation of biofuels investment, as a reading of Tanzania's latest Rural Development Strategy from 2001 shows: 'At present demands for energy supplies is treated in isolation from other development needs. As a result impacts tend to be piecemeal and [do] not meet the real requirements of the community'.[15] It is worth noting, however, that the context in which many rural policies were written, as this example from Tanzania shows, is one that was appropriate to ten years ago when biofuels were not in the picture. At that time Tanzania's emphasis on rural energy sources was to encourage the use of alternatives, then identified as 'solar power and power from spillways currently used for irrigation and drinking water services… [and] other abundant, but so far not fully tapped, indigenous energy sources, which could be harnessed to meet the growing energy requirements, [including] hydropower, coal, natural gas, solar, wind, and geothermal energy'.[15] Most developing country energy policies[2] and rural development strategies are a sign of the (pre-biofuels) times.

2. THE INTEGRATED GLOBAL CONTEXT

The developing country domestic biofuels context is changed as much by the potential of biofuels to provide energy in rural areas, as it is by the prospect of governments to make earnings from their lucrative new export. It is now that sub-Saharan African countries, with their huge comparative advantages in land, labour and favourable climatic conditions, enter a global integrated network where environmental sustainabilities in particular can be more easily accommodated than the vulnerabilities for marginal and peripheral groups.[1,16] This increasingly globalising structure provides fuel for many

different interest groups to create their own narratives and influence national policies such that, while a 'new global compact between the rich and the poor' may indeed be developing, the conditions that generate inequality remain unchanged.[17] In the debate about global energy interests, for instance, the on-going push to source and produce biofuel for transportation frequently takes centre stage and risks overshadowing concerns for an understanding of broader *bioenergy* access and the associated livelihood considerations of many people in developing countries.[5]

The formulation of new biofuels policies in developing countries provides a chance to address some of these inequalities. Some thorough research has fortunately been conducted in relation to bioenergy and marginalised groups, both in the technologies that are used and the socio-economic constraints and opportunities of what is available,[18-24] and lessons can be learnt from this existing literature to inform the new biofuels policies. The literature reveals that, while biofuels bring with them massive new challenges relating to global concerns such as water and food security, climate change and environmental degradation, more local and less fashionable developmental imperatives such as equity and energy poverty still remain. The paper now turns to these with a discussion of equity and energy poverty, and then points to the current poverty of empirical evidence to inform us of the situation on gender issues relating specifically to biofuels in developing countries.

3. ENERGY, POVERTY AND EQUITY

A significant challenge in implementing the existing bioenergy policies has been in issues relating to equity – a term that is frequently cited in relation to numerous development ambitions, but rarely clearly defined. For example, as 'bioenergy' is still sometimes used by northern-based academics, research institutes, private companies and NGOs as a synonym for 'biofuels', so studies of energy in developing countries frequently treat 'equity' as synonymous with 'gender'.[25] A pro-poor focus is often also the assumption. A broader definition of 'equity' should certainly include the poor, but could be extended to consider anything that bears the quality of being fair and impartial. In relation to energy and development, this could also include consideration of age, ethnicity and, as stated, poverty. An example of where poverty fits into an 'equity' dimension of energy is the fact that, in absolute terms, poor households use less energy than wealthier ones. Less water is boiled for drinking and other hygiene purposes, thereby increasing the likelihood of water-borne diseases. Illness often then reduces the ability of poor people to improve their livelihoods and increases their vulnerability, not only preventing adults from being able to work, but also negatively effecting children's learning by keeping them from school.[26]

These socio-economic indicators of poverty are strongly correlated with fuel type and consumption,[27] and it has been observed[28] (with no mention of biofuels) that as people increase their income they generally climb what has been coined a 'fuel ladder' with firewood at the bottom, then charcoal, kerosene and gas, and electricity at the top. This paper concentrates on gender equity, with a specific focus on women, since it is they – irrespective of their age or ethnicity or other categories to be considered when dealing

with equity concerns – who tend to be responsible for providing energy in the household, especially in households that consume fuels at the lowest rungs of the fuel ladder. Such a focus inevitably has a poverty dimension, and helps explain an understanding of equity as both gender-sensitive and pro-poor. In a more traditional definition of poverty, many women in developing countries would certainly be classified as 'poor' because many of these women have low cash incomes.

This economic definition of poverty has now been subsumed by a wider conceptualisation that tries to reflect how the poor themselves describe their situation. Poverty is now more often described in terms of marginalisation: a lack of access, for example, to goods and services, whether that is a lack of access to sufficient levels of food, water, clothing, shelter, sanitation, healthcare, and/or education. Until recently, however, there have been few efforts that have seriously considered energy within the poverty mix; this despite the fact that globally around 2.5 billion of the world's poorest people rely on bioresources every day. Fittingly, the term used to describe the absence of choice in accessing adequate, affordable, reliable, high quality, safe and environmentally benign energy services is 'energy poverty',[29] described by Practical Action as 'the hidden energy crisis'.[30] The equity dimension of energy poverty has been exemplified in absolute terms in the example above: poor households use less energy than wealthier ones and this, in turn, has repercussions on the quality of those goods and services, such as clean water and education, that poor people have less access to. Yet there are other influences of energy poverty that are related to the energy needs of the poor but are beyond what we normally associate with the immediate sphere of the household, such as

the need to cook food and boil water. For example, the agricultural sector is linked to household energy through opportunities provided by bioresidues as a fuel source that might be used in various income-generating activities. Similarly, opportunities for education are promoted by the simple ability of energy to provide light for study beyond daylight hours. A broader definition of household energy might therefore include all the activities that take place within a household and the linkages to a much wider system of energy supply and demand.[31]

There is little reason to believe that issues of equity, whether gender equity or any other focus, will not continue to be a challenge in relation to biofuels – if not in guaranteeing that equity is suitably covered in biofuels policy, then more likely in actually making a positive contribution towards ensuring that the most marginalised groups benefit from the opportunities that biofuels can offer. Despite developing country policymakers having much existing knowledge on bioenergy and gender issues, in developing and developed countries alike the limited number of biofuels programmes means that there is little direct empirical evidence about gender issues specifically related to biofuels that can be drawn on to influence biofuel policies. As Clancy[32] notes, the literature tends to draw on the experiences of women and men in general agricultural production for export markets and, by extension, this quite different situation is used to draw conclusions about the likely effects of biofuels production. The starting point, therefore, is what our knowledge of the existing state of broader bioenergy use can tell us about bringing gender equity to developing countries' energy policies.

4. 'ENERGIZING' GENDER EQUITY

Of the approximately 1.3 billion people who are living in poverty, it is estimated that 70 per cent of the adult population are women, and many of them live in female-headed households in rural areas. In sub-Saharan Africa it is estimated that female-headed households constitute between 50 and 80 per cent of rural households.[31] It comes as no surprise, therefore, that poor women bear the brunt of the detrimental implications relating to any of the above energy poverty issues. Irrespective of who is the household head, gender inequality also is more or less pervasive in many developing countries at community and society level, with women in a subordinate position. This is acknowledged by Millennium Development Goal 3 in particular, which aims to promote gender equality and empower women, and which can be 'energized'[33,34] by considering that lack of access to modern fuels and electricity contributes to gender inequality: since women are responsible for most household cooking and water boiling activities, this takes time away from other productive activities as well as from educational, economic and social opportunities.[35]

As of the most recent MDG stocktaking in September 2010, overall progress is mixed[36] with doubts that Malawi, for example, will achieve the goals including, inter alia, achieving reducing gender inequality (Wambua CM, unpublished). Whether countries actually take energy into consideration for such a lofty – some might say vague – goal as 'the promotion of gender equality and empowerment of women' depends on numerous factors relating to policy formulation and implementation at various levels of government. One of the largest challenges to overcome here is that gender roles are

deeply ascribed in what are often fairly socially conservative societies. In households with adult men and women, for example, the gendered division of labour in many developing countries generally allocates to women the responsibility for household energy provision related to their spheres of influence in the household, and in particular activities centred on the kitchen. Yet while men often enter the decision-making process when energy has to be purchased,[24] it is usually poor women who carry the burden – both physically and metaphorically – for biomass fuel collection and use.[*] This is a major aspect of the lives of most poor women (as well as school-age girls and, sometimes, boys), and is a task demanding of both human energy and time. Women are thought to spend three times as much time transporting fuel and water than men.[18] In terms of hours spent, the case of women in Burkina Faso suggests that this can equate to something akin to five hours per day spent on firewood collection, water hauling, food processing and cooking (and another four hours is devoted to other essential activities, such as agriculture).[37] The time spent on these kind of activities represents a huge lost 'opportunity cost' for poor women, [38] with women and young girls being denied opportunities for other more productive activities such as employment and education, not to mention much needed time for rest.[34]

The responsibility for household energy provision also affects women's health disproportionately to men's. It is now well known, largely due to the efforts of the World Health Organisation (WHO) in highlighting the issue, that women have higher levels of

[*] For a counter case where both men and women in urban areas across Kenya provide money for purchasing fuel, but women are the key decision makers on the types of fuel used, see wa Gathui T and Ngugi W, *Bioenergy and Poverty in Kenya: Attitudes, actors and activities*. Practical Action Consulting in Eastern Africa, Nairobi (2010).

lung and eye diseases than men due to the longer hours of exposure to smoke and particulates in smoky kitchens.[9,39] These now commonly-known effects of biomass combustion impacts, however, are only one of the many aspects of a fuel cycle of collection, transformation, transport and use, each of which have their own specific impacts that are less well documented. When collecting biomass, for example, women suffer from long-term effects such as back problems from heavy loads. Indeed, one study states that women in developing countries regularly carry four times as much fuel in volume as men.[18] There are many other ailments caused by insufficient rest for the body,[26] as well as other underreported effects such as the risk of rape while walking to less populated areas to collect fuel.[37]

Women's exposure to pollution in the kitchen has been reduced in some cases by improved cook stove programmes such as the *Anagi* stove in Sri Lanka[40] which, as various case studies from Asia, Latin America and Africa show,[41] also come with the possibility of reducing women's work burdens and giving them a sense of modernity and increasing their sense of wellbeing. As Clancy[27] notes, however, it would not be unreasonable to say that there has been a certain disillusionment with improved cook stove programmes and other interventions, such as biogas and solar cookers, because they have failed to live up to their expectations – not least in terms of gender sensitivity. This calls for a gender equity perspective to energy that focuses as much on social roles and relations between men and women[42] as it does on ascribed responsibilities.

4.1 A gendered perspective to energy

A report for the United Kingdom's Department for International Development on the gender-energy-poverty nexus,[24] and supported by other studies,[43] demonstrates the faults of failing to adopt a gendered approach in interventions: trying to convince women that improved, more fuel efficient stoves are in their interest, for example, is doomed to failure unless the factors that women themselves consider important are taken into account. Such considerations may include awareness of the central role of the stove in the household, and that in many societies cooks (who are invariably women) prefer to cook indoors for social reasons. Furthermore, for a woman to purchase an improved stove or to attend a stove-building course requires her to have access to, and control over, income, and a sympathetic husband.[27] Even if this is the case, further decision-making issues come into play that may affect what other positive interventions women might otherwise benefit from. For example, while an initiative of obtaining land to plant trees for fuel to ensure that poor women spend less time travelling far to collect it might be beneficial, in many societies women are rarely conversant with land ownership issues[20] and may not have control over what is planted.[27] Similarly, men often take the lead in new commercial cash crop opportunities, and in doing so can replace biofuels feedstocks on small-holder land being used for vital food security.[44] An understanding of the different roles of women and men in decision-making around household energy issues and the interconnectedness with other sectors is therefore a key aspect to any sustainable gendered approach towards bioenergy, or biofuels specifically, in developing countries.[45]

Energy is not a gender-neutral issue, and a gender equity perspective is required that acknowledges household energy to be about more than only concern for poor women

who spend much of their time collecting firewood and who are not able to cook because they are ill from smoke inhalation due to indoor air pollution. It is correct to say that household energy is primarily the responsibility of women and, as discussed, it is often women who get ill from air pollution and who disproportionately carry the burden for biomass collection. Yet there are some cases (especially where for cultural reasons women are restricted from leaving their homes) when men can be involved in collecting fuel over long distances, for example, or in its purchase. In general, however, women and men do tend to have circumscribed roles when it comes to household energy, and much decision-making within the household can be a male preserve.

A gender equity perspective should therefore start from a point that appreciates the reality that, on the basis of gender/sex alone, women and men have different roles, activities and responsibilities. This informs the Food and Agricultural Organisation's (FAO) definition of 'gender' that refers to the social roles and relations between women and men, and includes the different responsibilities between women and men in a given culture or location.[46] This approach understands that gender roles are determined socially and are not biologically-determined differences. A clear distinction therefore has to be made between 'women and energy' (which development projects sometimes focus on) and 'gender and energy', or more specifically, 'gender and biofuels'. A focus on gender and energy recognises that men and women often use, are impacted on, or benefit from, energy services differently, and that these may impact on the opportunities and different social or economic outcomes of the other. As Clancy et al[21] put it, 'gender analysis is not about looking at women alone, nor is it about complaining that women suffer more than

men: rather gender is about reaching a better understanding of how communities work from the perspective of relationships between men and women.'

4.2 Mainstreaming gender into biofuels policy

A gendered approach would also appreciate that men and women will often have different perceptions of, and priorities for, their energy needs.[47,48] This growing appreciation of different spheres for women and men comes at a time when poverty reduction strategies to facilitate empowering marginalised people have also become more appreciative of empowering people. Increasingly these efforts are being directed at the policy level to address the inequalities – including, in the case of climate finance, gender inequalities[49] – that hinder poor peoples' influence over policies and interventions that affect them. As Cecelski[50] puts it, 'gender assessment needs to be *mainstreamed* in the project and policy cycle – every energy project should plan for, monitor and evaluate the differential impacts of energy on women and on men; every energy policy should include a gender assessment' [emphasis added]. The pressing energy policy concern for many developing countries is currently biofuels, and it is argued here that gender needs to be mainstreamed into developing countries' biofuels policies.

Mainstreaming is the act of bringing into ideas, attitudes or activities something that is regarded as normal or conventional. Gender mainstreaming can be described as the deliberate, planned, intended strategy to transform the gender order throughout society, including organisations, programmes, and projects,[51] and mainstreaming gender and/or mainstreaming the poor has now become more common practice in international

development.[51,52] Yet as Skutsch et al[24] point out, whereas in many developing countries gender analysis has been successfully used for many years in the health, water and agricultural sectors, and it is now gathering momentum among those working on combating the effects of climate change,[49,53,54] in energy planning an approach that is sensitive to gender is far from mainstream. The focus in energy policy has been on increasing the efficiency in the electricity sector through privatisation, and on reducing subsidies on fossil fuels – to the exclusion of biomass fuels. This has meant that the daily practical needs of women in developing countries, such as their cooking requirements within the household, have been insufficiently addressed.

Gender is slowly gaining a place on the energy agenda in developing countries, and there is some evidence from Eastern and Southern Africa, and from Asia,[55] that policymakers and policy statements are increasingly aware that the power sector will only achieve sustainable development if gender analysis is integrated into policy formulation. Frequently, however, and despite new research on gender and energy in developing countries such as Botswana, Kenya, Tanzania and Zimbabwe, the direct influence of research on energy sector policy formulation appears to be limited and is only backed by vague policy objectives.[56]

Country-level efforts for policymakers to work with researchers on policy formation are now underway in Kenya, Sri Lanka and Tanzania with the establishment of bioenergy Policy Working Groups (PWGs) that seek with other stakeholders to develop a combined consultative methodology on participatory policy dialogue, and aim to apply the same in

developing bioenergy policy.[57] The presence of women on the PWGs is important in ensuring that gender issues are mainstreamed into policy, and their representation is gaining momentum with gender parity on the Kenya PWG. In Sri Lanka, which also has representation of the national focal point for the ENERGIA Gender and Energy Network, the ratio of men to women is 3:1. In Tanzania the ratio is 2:1, which still provides an opportunity to realise the latest national energy policy's desire to encourage 'increased female participation as decision-makers at all levels'[58] – something that is happening with women's increasing participation in the Tanzania National Biofuels Task Force, despite criticisms[17] of the overall weakness of governance in the country's biofuel development. It is worth noting, however, that in any country there is quite a difference between informed women consultant-types on bodies such as PWGs, and a smaller (usually male-dominated) group of decision-makers who have the final say on national policy. In electoral terms though – something that is close to the heart of most politicians – it may be the case that a sympathetic male political champion of women's rights pales in comparison to a empathetic female supporting the same cause.

In keeping with the necessity to conceptualise a broader understanding of bioresources, bioresidues and biofuels as together being of importance to the lives of men and women, the Policy Working Groups use bioenergy as a reference point when discussing policy. With increasing interest in biofuels investment, however, some members of the PWGs are keen to see that issues relating to biofuels are discussed in the development of national policies.(Author identifier removed, 2010, pers. comm.) This is particularly important where developing countries do not have bioenergy policies in place that deal

adequately with gender, as Wambua (unpublished) suggests, for example, is the case for Malawi. Maintaining broader perspectives is also important where the Ministry of Energy takes the lead, as is often the case in bioenergy/biofuel policy development in developing countries, and where the concern for the volume of biofuels generated to replace imported fuels is greater than the concern for socio-economic development. As Nderitu (unpublished) notes in relation to bioenergy technology development, this situation calls for a change in tact from traditional technology approach to a more holistic method that incorporates all actors involved in the technology supply chain and in the biofuels system. The interaction of these actors and resultant relationships builds the required capacity for systems that can better promote gender equity.

PWGs provide an excellent opportunity to mainstream gender early on in biofuels policy development, but they must take on board lessons from the difficult experience of mainstreaming gender in bioenergy more generally. Some excellent studies have already been conducted, notably by research teams led by both Joy Clancy and Elizabeth Cecelski and others cited throughout this paper, which point to some of the challenges of achieving equity, and gender equity in particular, in the energy sector. The paper now turns to gaps in this literature which need to be filled in order to present the best case when attempting to mainstream gender in developing countries' biofuels policies. As the Kenya, Sri Lanka and Tanzania PWGs recognise in their approach to the pressing issues of biofuels, it is vital here to consider biofuels alongside bioresources and bioresidues as together forming the bio*energy* mix that is so important to the marginalised in most developing countries.(Author identifier removed, 2010, pers. comm.)

4.2.1 Fuel type and acquisition: What women want

The literature gives examples of the possibilities for improving the position of poor women through energy,[26] but a gendered approach would ask what women (and men) themselves want in terms of fuel type and its acquisition. The answers to the following questions, raised initially in Skutsch et al,[24] are important for the formulation of biofuels policies that address women's strategic needs: Do women in developing countries want to continue to use charcoal or fuelwood – 'the "other" renewable energy source'[59] – albeit with more efficient stoves, because it fits with their traditions or for other socio-cultural reasons?[39] If this is the case, what kind of improvements are needed, or would women prefer to use gas (biogas or LPG) or electricity simply because they value the convenience? Would rural women pay for wood (good quality, regular supply, in quantities that matched cash flow) if it relieved them of the burden of collection and freed them to participate in income generation, community activities, or to devote more time to their families? How far does personal preference go in the face of, say, environmental crisis where we have a situation that sooner or later wood resources are going to run out? Are women more likely to take this on board, and are they more willing than men to make changes sooner rather than later? What are the limits of coercion in terms of energy sources when many of the poor – both women and men – in developing countries are already in a situation where beggars cannot be choosers?

4.2.2 Energy and income-generating activities

The role of energy in the sustainability of women's enterprises is not well understood,[27] but is an increasingly important topic as pioneer companies are implementing business models that include small-scale enterprises in processing and distributing biofuels.[13,14] Poor women, particularly those in rural areas, undertake (usually informal) income-generating activities, including the gathering of wood for sale,[60] that are frequently labour-intensive and are often strongly linked to household and agricultural duties. Cottage industries tend to be energy-intensive and rely on biomass fuels used with low efficiencies of energy conversion. In some income-generating activities, such as food processing, energy costs are 20-25 per cent of the total inputs. As Skutsch et al[24] note, it would be prudent to find out the constraining role that energy plays in the sustainability of small-scale enterprises – both those processing and distributing biofuels, and the many more micro and small enterprises that are involved in other income-generating activities.

Many women's income generating activities are based around processing heat, for which electricity is not necessarily the cheapest option. Where electricity is available in rural areas it is mainly used for lighting. This can extend evening working hours and may mean that women do not have enough time to rest. The extent to which electricity is used for cottage industries has not been systematically researched.[27] An additional question beyond the constraining role of energy on income-generating activities might obtain some initial information on the advantages and disadvantages that women have observed with access to electricity.

4.2.3 The reality of 'extra time'

It cannot automatically be assumed that women will invest in productive activities when they have gained 'extra time' from labour-saving practices or technologies.[26] A study in Sri Lanka, for example, found that when women reported on how they used the 'extra time' that using electricity had brought to their lives, 29 per cent said they used it for extra housework, while less than 5 per cent reported using the time for other productive activities.[61] We need to find out how women think that they would be able to use any 'extra time' that they may gain through labour-saving practices or technologies and, if they manage to achieve it, the reality of how they really are able to use that time.

4.2.4 The effects of privatisation

It is not yet clear whether privatisation will result in more, or less, access for the rural poor to modern energy forms.[26] Although emerging evidence from India is not positive, privatisation does offer the opportunity of contributing to sustainable livelihoods by giving new entrepreneurs with the opportunity to enter the market by providing local level energy services in rural areas. Any questions on privatisation would have to clarify what privatisation means, and how it might differ from other initiatives that affect women. If women have been exposed to privatisation, what advantages and disadvantages have they experienced?

4.2.5 Control over land

In developing countries such as Kenya, fewer than 5 per cent of women farmers own land.[62] Evidence from elsewhere in sub-Saharan Africa suggests that women are often allocated low quality, marginal lands by their husbands,[25] and this position is likely to be

further weakened in the "biofuel frenzy"[63] as land in developing countries used for farming and a supply of residual biomass is further contested with the introduction of powerful forces that risk further marginalising the poor, and women in particular.[6] Further research is required in order to understand the processes driving these situations as they relate to gender. A start might be to ask women how much control they have over what is planted on the land that their household has access to. At the policy level, ensuring that women's property rights are enshrined in law and that these rights are enforced could also enhance gender equity in the benefits of participation in biofuel programmes.[32] Without this, if land rights are gender biased, biofuels policies that try to impact on gender equality are likely to struggle in this objective.

CONCLUSION

This paper has pointed to the formulation of biofuels policies as a pressing concern for developing countries and has argued for gender to be mainstreamed at an early stage in the development of these policies. Gender mainstreaming is understood here to be the deliberate, planned, intended strategy to transform the gender order in policy. The paper has suggested that biofuels policy is seen as complimentary of wider energy policies, and it is important to notice that in many previous policies gender mainstreaming has always been a challenge, especially in implementation. The challenge of gender mainstreaming is therefore less one of taking a gendered approach and getting gender issues into policy documents than it is of actually implementing the gender aspects of the biofuels policies and in executing change. This paper argues that policy objectives relating to gender have to be specific, which is more achievable when the research that informs policy objectives

is gender orientated. To this end, a review of the wider bioenergy literature points to a need for better knowledge of gender in relation to: what women (and men) themselves want in terms of fuel type and its acquisition; energy and income-generating activities; the reality of 'extra time'; the effects of privatisation; and issues relating to control over land. All of these issues now relate to gender and biofuels as much as in the past they have related to gender and bioenergy, and require some bold moves in wider policies. (Given the nature of biofuels, however, the prior challenges are likely to be exacerbated; the impacts are much greater and at a larger scale; and the time that policymakers and researchers have had to respond is much shorter, so we cannot devote much time to re-learning 'lessons learnt'). This paper has shown, for example, that for women to benefit from participation in biofuels programmes requires that they have greater control over land, but this requires not only that women's property rights are enshrined in law but also and that these rights are enforced – and this can be tough in some male-dominated societies. In turn, to successfully implement policies and legislation on the ground requires institutional capacity and frameworks – something that much of the recent biofuels in developing countries literature covers in its recommendations.

As a practical move towards this end, this paper has introduced the newly-established Policy Working Groups (PWGs) in Kenya, Sri Lanka and Tanzania. In these countries the PWGs have become a vehicle that involves women in high-level biofuels policy consultation and formulation, with representation in some cases of influential women who are well-placed to better ensure that the fine words about gender in biofuels policies are translated into action. The overall effect of women's representation on the PWGs can

be that they help to ensure that with the important global concerns that surround biofuels – water and food security, climate change and environmental degradation, to name but a few – policymakers are not allowed to forget that more local and less fashionable developmental imperatives still remain. Evidence from recent PWG meetings suggests that determined women are able to keep the marginalised on the agenda. Here researchers have an important role in compiling empirical evidence of gender issues in existing biofuels initiatives in developing countries. At present the evidence base is weak, despite the increasing interest in biofuels development in developing countries. With more empirical evidence of the current situation, we will be able to present the best case when attempting to mainstream gender at this crucial juncture in the formulation of developing countries' biofuels policies.

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